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ABSTRACT

The basic issues, problems, techniques, and history of program evaluation are reviewed, with emphasis on the evaluation of learning assistance programs. The following topics are discussed: (1) historical perspectives (origins of the evaluation process, program evaluation in education); and (2) theoretical constructs (typologies of evaluation designs, Boylan's four-tiered program evaluation model, Clowes's stage model for program evaluation, and a comparative critique of Boyland and Clowes). A selected annotated bibliography for additional study of program evaluation is appended. (Seventeen references are included.) (KM)

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Research In Developmental Education



Gene Kerstiens, Editor

Evaluation of Developmental Education Programs: Issues, Problems, and Techniques

By Robert L. Somers

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INTRODUCTION

Developmental education and other learning assistance programs are being called upon more and more frequently to demonstrate accountability to a seemingly infinite number of constituencies, both from within and from outside the institutions that house them. Furthermore, these calls, more often than not, are perceived as threatening to practitioners in the field. Certainly the necessity, desirability, and fairness of these calls may be varicously debated. Their reality, however, cannot.

Inasmuch as the call for program evaluation has become a fact of life for currently practicing professionals in developmental education, it therefore behooves professionals to respond in a professional manner by seizing every opportunity to demonstrate how well they are doing their jobs. After all, the verb "evaluate" means to "put a value upon." Thus, the evaluative process entails more than simply counting categories of students or recording gain scores: *evaluation documents the value of professional efforts.*

While this article introduces some basic issues and problems pertaining to the evaluative process in general,

particular emphasis is placed upon the evaluation of learning assistance programs. Historical perspectives, theoretical constructs, suggested designs, and application tips are offered not as an exhaustive treatment leading to the answer, but rather as a general discussion highlighting the techniques and assistance needed to comfortably perform a credible job of program evaluation as local circumstances dictate.

HISTORICAL PERSPECTIVES

This section presents a brief overview of the historical context and cultural milieu in which the phenomenon of evaluation developed and emerged as a discrete entity.

Origins of the evaluation process

The evolution of the modern practice of evaluation is a nebulous history—an unfortunate circumstance indeed for the chronicler of the phenomenon! Indeed, about the only thing most authorities agree on is that evaluation is the natural child of close cousins within the family of recently emerging disciplines called the "social sciences."

Citing the relative infancy of social science research in general, Fitz-Gibbon and Morris point out that Sir Ronald Fisher's work in statistics, "an essential methodological step forward for the social sciences," was only completed during the 1930's (1978, p.13). Similarly, Anderson and Ball wryly observe that, "It has been debated whether program evaluation

qualifies as a profession, or a discipline, or simply an activity or job..." (1978, p.219).

In any case, the point remains that one of the first and most formidable problems that evaluation poses both to the historian and to the practitioner is its relative novelty and immaturity as a process. Its emphasis, focus, and methods have shifted kaleidoscopically during its brief development.

Program evaluation in education

During the 1920's and 1930's, the ascendancy of the measurement movement—coupled with the burgeoning social science disciplines—presaged the notion of educational program evaluation as it is known today. The works of thinkers such as Durkheim, Freud, and Piaget were ushering in a new era. Rudimentary forms of subdisciplines, social and educational psychology among them, were emerging.

Scholarly opinion is unanimous in crediting Ralph W. Tyler with laying the foundation for current practice in program evaluation (Anderson, 1975, p. 143; and Pace & Friedlander in Hanson, 1978, p. 2). Tyler's eight-year longitudinal study for the Progressive Education Association, which he initiated during the 1930's, merits its status as a seminal work for diverse reasons.

Departing from the traditional practices of measurement (counting) in program evaluation, Tyler insisted

continued

continued from page 1

upon clearly defining program goals and objectives in behavioral terms as standards against which to assess program effectiveness. Similarly, and no less significantly, he also advocated expansion of evaluation-design parameters to include the affective domain as well as the cognitive. Needless to say, these contributions have had far-reaching implications whose ultimate consequences are seen today, not only in program evaluation, but also in curriculum and instruction (e.g., competency-basing and criteria-referencing) and in learning theory (e.g., learning- and teaching-styles research and application).

The decades following the 1930's also have given impetus to strides in program evaluation. During the 1940's, the need of the military for fast and cost-effective training in time of national emergency spurred further research and application in the field of evaluation. The psychomotor domain (e.g., flight simulators for pilot training) became a primary beneficiary. The post-Sputnik era spurred evaluation efforts aimed at curriculum reform. Critical-path analysis, PERT charts, and zero-based budgeting are all examples of evaluative processes triggered by weapons development and by the race to the moon. Nor can one overlook the current proliferation of electronic technologies, from films to satellite TV, that continues to drive evaluation efforts to assess the effectiveness of such devices in supplanting traditional means of instruction.

Finally, and not inconsequentially, the role of legislative mandate in fueling educational program evaluation cannot be overstated. The precedent set by Title I of the 1965 Elementary and Secondary Education Act has become the standard in tying annual appropriations to the presentation of evaluative reports.

In summary, program evaluation in education developed from diverse roots. Grounded in the social sciences, it also has acquired tools and methods adapted by those disciplines from the natural sciences. Various circumstances have shaped the process as it is known today. Driven both by practical necessity and legislative mandate during the past fifty years, program evaluation has become entrenched and institutionalized in the educational community.

THEORETICAL CONSTRUCTS

This section contains a survey of contemporary thinking that undergirds the modern practice of program evaluation. First, various perspectives on the evaluative process are presented through summaries of representative typologies of evaluative designs, and then two new models that hold promise for the developmental practitioner are discussed in greater detail.

Typologies of evaluation designs

Inasmuch as evaluation sprang from diverse roots and is a relatively recent phenomenon, it should come as no surprise that there are virtually as many classification schemata as there are writers and practitioners. For example, Pace and Friedlander identify, albeit with considerable ambiguity, at least five "schools of thought" (Hanson, 1978, pp. 1-17).

First is the *educational psychology* model identified with figures such as Ebel (1965) and Thorndike and Hagen (1969). For this group, evaluation is viewed as "a judgment of merit, sometimes based solely on measurements...but more frequently involving the synthesis of various measurements, critical incidents, subjective impressions, and other kinds of evidence" (Ebel, p. 450).

A second type is labeled the *professional judgment* approach. Its rather nebulous process relies on the opinions of "experts" and is the type of evaluation derived from the formalization of school and university accreditation procedures.

The *educational decision* model is a relatively recent design concerned expressly with aiding decision makers in making informed choices among available alternatives. Alkin (1969) and Stufflebeam (1971) are major figures associated with this school of thought.

Astin and Panos (1971) are proponents of the *educational science* model which attempts to establish cause-and-effect relationships among observable outcomes. Its methods are firmly grounded in the techniques of educational research.

A fifth school, the *educational change* design, applies the principle of *inclusion* from group-process theory to assure the participation of all constituencies who might be affected by a

possible departure from the status quo. Students, faculty, administrators, and governing boards all participate in this design along with the researchers and evaluators. Its goal is institutional improvement.

Other writers have struggled similarly with evaluation typologies. Dressel (1976, pp. 3-4) outlines three approaches roughly analogous to the educational science, educational psychology, and professional judgment models. Subsequently (pp. 15-17), he proposes four types of evaluations and blurs—not without good cause—the traditional distinctions between formative and summative evaluations. His schema contains *planning*, *input*, *process*, and *output* types, all of which he maintains may be formative, summative, or a combination of both depending upon the purposes and circumstances of the evaluative effort.

House (1978) identifies *eight* models while Guba and Lincoln (1981) insist upon distilling those eight into only two generic types, the *countenance evaluation* and *responsive evaluation* models. Tuchman (1979, p. 10), on the other hand, chooses simply to classify evaluations as either being *formative*, *summative*, or *ex post facto*. Anderson and Ball (1978, pp. 3-4) wisely avoid the issue by focusing on *purposes* rather than models.

Chaotic as they may be, such heuristic typologies do serve useful purposes. They attempt to establish a common perspective on evaluation and to define a common language for sharing ideas about the process. All this brouhaha about classification aside, what is clear is an overriding concern for judgments about worth or merit and the processes used to achieve those judgments.

Boylan's four-tiered program evaluation model

Two recently published works (Somers, Boylan, and Clowes, 1986; and Somers, 1987, pp. 13-14 & pp. 18-19) introduce the four levels of an evaluative design advocated by Boylan for structuring a program evaluation. For purposes of review and explication, each level is summarized verbally and pictorially in this subsection. (See Figure 1.)

Level One: Primary focuses on traditional measurement (counting)

FIGURE ONE:
Boylan's Model At A Glance

LEVEL	FOCUS	EXAMPLE
Primary (Counting)	How many? How much?	300 students in 5 courses
Secondary (Formative)	What Happened?	68% achieved "C" or above
Tertiary (Summative)	What was accomplished?	12% decrease in attrition
Serendipity	Unanticipated benefits not intentional in the program design	satisfaction with program generates more alumni revenue

practices. Data are collected to answer questions framed in quantitative terms; "How many?" and "How much?" are central issues. Outcomes at this level might be: "The University of XYZ enrolled 300 students in 5 developmental courses during the 1978-79 academic year."

Level Two: Secondary focuses upon traditionally formative questions about program effectiveness. "What happened to students while they were in the system?" is the key issue at this stage. An example of an outcome at this level might be: "Of 300 students enrolled in developmental courses, 207 achieved an average of 'C' or better in all course work attempted during the 1978-79 academic year."

Level Three: Tertiary concentrates on the longer-term or summative effects of the program. An outcome at this level might be: "The 300 students enrolled in developmental courses during the past 10 years had an attrition rate 12 percent smaller than a comparable non-developmental control group."

Level Four: Serendipity concerns identifying any unanticipated, gratuitous program benefits that might emerge during the course of an evaluation. The single most salient characteristic of outcomes at this level is that such benefits are unintentional in program design; that is, the program was not consciously designed to reap such rewards. Outcomes of this type might be: "A five-year longitudinal analysis of alumni activities in-

dicates that graduates who completed developmental courses contribute more to the XYZ Foundation and refer more potential students to the admissions office because of program satisfaction that do graduates-at-large."

Clowes's stage model for program evaluation

Originally published in 1984, a four-stage model of program evaluation designed by Clowes for remedial/developmental programs also was recently reviewed and assessed (Somers et. al., 1986; and Somers, 1987, pp. 15-17 & pp. 18-19). It, too, is summarized verbally and pictorially in this subsection. (See Figure 2.)

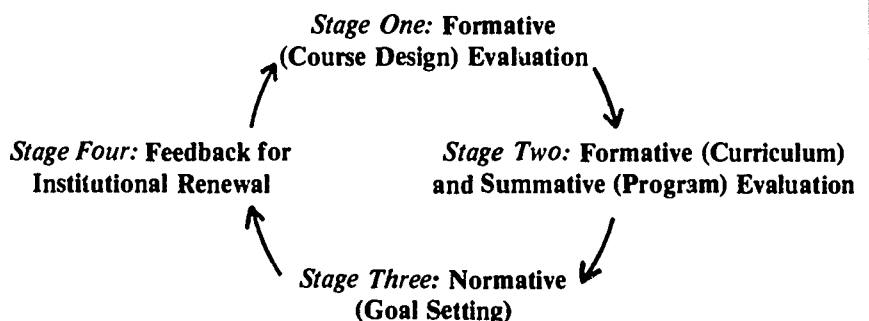
Stage One: Formative concentrates on quantitative methods designed to

answer questions about what happens to learners while they are in the program. The audience at this stage consists primarily of the program staff. Ideally, this internal audience uses such data to make on-going improvements in course design. Examples of appropriate measures at this stage include grades, persistence in courses, and ratio of hours attempted to hours completed successfully.

Stage Two: Summative concentrates upon finding answers to questions about what happens to developmental learners after they have exited the program, i.e., "How do they fare in the mainstream curriculum?" This stage, however, is both formative and summative—formative in that the developmental program curriculum is assessed as a whole, and summative in that the effects of the overall program are determined. Qualitative as well as quantitative data are prepared for external audiences. Transcribed data, staff qualifications, and level of program satisfaction are examples of measures appropriate at this stage.

Stage Three: Normative also is a genuinely formative process to the extent that it focuses on reassessing program goals, not only for the developmental or remedial program, but also for mainstream curriculum programs fed by the former. Stage two data and judgments are used with both internal audiences (e.g., all concerned staff and administrators) and external audiences (e.g., program advisory committees and potential employers) to facilitate the process of renegotiating and melding the goals of institutional segments.

FIGURE TWO:
Clowes's Stage Model At A Glance



Stage Four: Feedback involves reconsidering the measures and techniques used in the first two stages in light of the renegotiated program goals formulated in stage three. Given these revised goals, appropriate measures and techniques must be considered to evaluate them. The primary thrust at this stage is institutional renewal. Ideally, all institutional constituencies (audiences) are involved as this stage has implications for the mission of the institution. The process recommended for use at this stage is comparative studies of groups of learners who have and have not participated in the developmental program.

Boylan and Clowes: A Comparative Critique

Practitioners should note that the differences between the Boylan and Clowes models make them inherently complementary. In consideration of appropriate applications for each design, a comparative critique of each follows.

The comparative simplicity of the Boylan design provides an exquisitely ready and easy formula for both the novice and the seasoned evaluator. A further advantage is that it may be executed more expeditiously. However, the Boylan model lacks the continuity supplied by the interfaces among the stages of the Clowes design. Similarly, Boylan's design also lacks an indigenous feedback loop that, in Clowes's model, makes provision for "evaluating the evaluation." Finally, tied tightly as it is to internal program goals, Boylan's model fails to

capitalize on opportunities for incorporating potentially useful data as might be externally derived, e.g., by the professional judgment approach.

Because of its comparative sophistication and initial independence from internal program goals, the Clowes design takes longer to execute—indeed, it theoretically could be run indefinitely. It demands vigorous execution, and its potential for the redundant could render it hopelessly cumbersome. Nevertheless, it is this writer's contention that the greatest strength of the Clowes design derives from its realistic approach. Compensating for the ambiguity of the educational process, Clowes eloquently and correctly advocates measuring program effectiveness against evolving, consensual goals rather than against the *a priori* goals of some heuristic model that is assumed to be both shared and understood by all concerned parties.

Succinctly put, the Boylan model is not as powerful as the Clowes design, nor as ambitious. One must bear in mind, however, that it was not designed to be so.

CONCLUDING ADMONITIONS

Previous sections have treated both the theoretical and applied aspects of evaluation. By way of conclusion, a few practical application tips are offered for developmental practitioners undertaking a program evaluation. They are deemed universally useful without regard to the particular design or methodologies that one might select.

DO

- Define an appropriate agenda:
 - who will be the audience?
 - what is the purpose?
 - what is to be evaluated?
 - what criteria will be used?
 - are the available data both adequate and appropriate?
- Include a feedback loop
- Prepare results appropriately for each "audience" who receives them

AVOID

- Forcing data to support desired conclusions
- Restricting too narrowly the area of inquiry
- Excluding key decision makers

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AUTHOR'S NOTE: While we have attempted to present a state-of-the-art synthesis and commentary for the literature, the suggested models are relatively new and untried. We therefore would appreciate hearing from practitioners as to their experiences with implementing them.

—RLS May 11, 1987

Selected Annotated Bibliography For Additional Study of Program Evaluation

Anderson, Scarvia B.; Samuel Ball, & Associates. *Encyclopedia of Educational Evaluation. Concepts and Techniques for Evaluating Education and Training Programs*. San Francisco: Jossey-Bass, 1974.

This book is the report of a longitudinal study conducted with programs for disadvantaged students in several institutions of higher education. It includes a discussion of development of special programs, and implications and guidelines for educational policy and program development for the disadvantaged (culturally deprived, high-risk educationally under-prepared or developmental students).

Anderson, Scarvia; Samuel Ball, Richard T. Murphy, and Associates. *Encyclopedia of Educational Evaluation*. San Francisco: Jossey-Bass, 1975.

Arranged in encyclopedic form, this volume contains a comprehensive review of the field of educational evaluation clearly delineated into eleven concept areas: Evaluation Models, Functions and Targets, Program Objectives and Standards, Social Context of Evaluation, Planning and Design, System Technologies, Variables, Measurement Approaches and Types, Technical Measurement Considerations, Reactive Concerns, and Analysis and Interpretation. The information is designed for any setting employing educational or training programs.

Anderson, Scarvia (Ed.). *Exploring Purposes and Dimensions*. San Francisco: Jossey-Bass, 1978.

The book examines all facets of educational programs. This includes the need of a program, planning, approaches, analysis, procedures for implementation, organization of staff and administration, and, most importantly, the evaluation of existing programs.

Anderson, Scarvia. *The Profession and Practice of Program Evaluation*. San Francisco: Jossey-Bass, 1978.

A leader in the educational field, Anderson discusses in depth the ideas of program evaluation, program implementation and practice, purposes, and some methods of evaluation. Also included are valuable theories of evaluation, and some ideas on the future of educational program evaluation.

Ball, Samuel (Ed.). *Assessing and Interpreting Outcomes*. San Francisco: Jossey-Ball, 1981.

Presents organizational, economic, methodological, conceptual and consumer perspectives on the definition and evaluation of significant program outcomes.

Benedict, Larry. *Project Evaluation*. Amherst: University of Massachusetts Press, 1973.

Although the author describes the steps necessary to evaluate programs, the main focus of the book is on the reasoning behind evaluation, and exactly what evaluation is, and should be.

Borich, Gary D., and Ron P. Jemelka. *Programs and Systems: An Evaluation Perspective*. New York: Academic Press, 1981.

This book is about decisions, values and systems, and how these concepts come together to create a network of ideas, activities, and responsibilities for program evaluation. The book is an attempt to widen the perspective with which the field of evaluation can be defined. Suggestions are made as to how the evaluator's role can be viewed more compre-

hensively to include the milieu of values within which every program functions and to which every program must in some sense be accountable.

Boruch, Robert F. (Ed.). *Secondary Analysis*. San Francisco: Jossey-Bass, 1978.

This is an introduction to selected topics in the relatively new field of evaluating evaluation—secondary analysis. The various articles included deal with reanalyzing evaluation data in education, types of secondary analysis, the justification for usage, institutional vehicles for facilitating the process, relevant institutional policy and individual ethics, and brief illustrations to highlight these various aspects.

Bowen, Howard R. (Ed.). *Evaluating Institutions for Accountability*. San Francisco: Jossey-Bass, 1974.

This is a collection of articles dealing with the controversy over accountability in higher education. These encompass a range of subjects such as the problems in objective assessment of educational outcomes, the types of research needed to evaluate higher education, the use of data systems in evaluation and planning, a review of the techniques for internal evaluation and an appraisal of their use and limits, the advantages to external evaluation, and the transactional frame of accountability.

Campbell, Donald T., and Julian C. Stanley. *Experimental and Quasi-Experimental Designs for Research*. Chicago: Rand-McNally College Publishing Company, 1963.

This publication examines the validity of 16 experimental designs against 12 common threats to valid inference. Its purpose is to better prepare researchers in education and to help them recognize the complexities in producing significantly valid results in an intransigent environment. With the type of detailed explanations presented, an understanding of the threats to validity will also help provide educational researchers with the means for optional statistical efficiency.

Cohen, Jacob, and Patricia Cohen. *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*. Hillside, NJ: Lawrence Erlbaum Associates, 1975.

Based on the authors' understanding of the relationship between regression and correlation, and the analysis of variance in standard textbooks, the book describes a systematic method for analyzing data in the Behavioral Sciences and details research.

Dressel, Paul L. *Handbook of Academic Evaluation*. San Francisco: Jossey-Bass, 1976.

This book presents a complete analysis of all phases of evaluation—formulating objectives, determining costs, collecting data, measuring program and institutional success, identifying undesirable effects, and recommending change. It specifies the purposes and requirements of evaluating all major aspects of higher education: admissions, orientation, and counseling processes that select and induct students; the campus environment that motivates learning; instructional methods, curriculums, courses, graduate and undergraduate programs; the cognitive and affective development of students; the non-instructional as well as the instructional boards; and the impact of state coordinating and control boards on institutions.

Federal Electric Corporation. *A Programmed Introduction to PERT*. New York: John Wiley & Sons, 1963.

PERT is the acronym for Program Evaluation and Review Technique and is primarily directed toward management and information systems for planning and control. This book is designed to present the basic knowledge necessary to use the technique and the applications of its rules and regulations in becoming a project analyst.

Grant, Donald L. (Ed.). *Monitoring Ongoing Programs*. San Francisco: Jossey-Bass, 1978.

A compilation of articles stressing the importance of evaluating ongoing programs. Information and examples are given for different kinds of programs in a variety of settings.

Hanson, Gary R. (Ed.). *Evaluating Program Effectiveness: New Directions for Student Services, Vol. 1*. San Francisco: Jossey-Bass, 1978.

This book discusses new methods for improving institutional programs and services for students. It highlights successful models of new programs in higher education, and gives guidelines for implementing more effective evaluation of these programs.

Love, Arnold J. *Developing Effective Internal Evaluation*. San Francisco: Jossey-Bass, 1983.

Explains how any organization's survival and growth can be enhanced with a successful self-evaluation program. Uses case examples to discuss applications of internal evaluation in health fields, industry, education, and corrections.

Loveland, Edward (Ed.). *Measuring the Hard-to-Measure*. San Francisco: Jossey-Bass, 1980.

Describes ways of overcoming difficulties in program evaluation stemming from such problems as overly abstract program objectives, imprecise program definitions, and unclear criteria for effectiveness. Illustrates approaches with examples of evaluation of such aspects of higher education as scholarships and teaching.

Morris, Lynn Lyons, and Carol Taylor Fitz-Gibbon. *Program Evaluation Kit*. Beverly Hills, CA: Sage Publications, 1978.

A series of eight booklets dealing with various aspects of evaluating educational programs. The titles of these booklets are: *An Evaluator's Handbook, How To Deal With Goals and Objectives, How To Design a Program Evaluation, How To Measure Program Implementation, How To Measure Achievement, How To Measure Attitudes, How To Calculate Statistics, and How To Present an Evaluation Report*.

Pace, C. Robert (E.). *Evaluating Learning and Teaching*. San Francisco: Jossey-Bass, 1973.

A series of articles on various aspects of evaluation in higher education. The complexity of this issue is discussed along with descriptions of its more important aspects, alternative ways of viewing and measuring parts of it, and some of the relationships and interactions about which one should be aware.

Parlett, Malcolm, and Garry Dearden (Eds.). *Introduction to Illuminative Evaluation: Studies in Higher Education*. Cardiff-By-The-Sea, CA: Pacific Soundings Press, 1977.

A collection of essays based on the editors' continued

continued from page 5

work in the field of evaluation in higher education. An effective procedure for helping educators and administrators understand the complex processes and outcomes of such a task is described. Data from case studies is used throughout the book to support the editors' account of what it means to be an evaluator of educational programs.

Sanders, James R., and Dean Nafziger. *A Basis for Determining the Adequacy of Evaluation Designs*. Bloomington, IN: Phi Delta Kappa and DEDR, 1976.

This paper suggests procedures for determining the adequacy of evaluation designs in advance of actually conducting evaluations. The authors have broken down the paper into four parts. In the first part, basic questions are considered. The second presents a checklist of basic considerations which are important in judging evaluation designs. The third presents a sample design. In the fourth part, noted professional educators present their thought about judging the adequacy of evaluation designs.

Tuckman, Bruce Wayne. *Evaluating Instructional Programs*. Boston: Allyn & Bacon, 1979.

This book gives a comprehensive treatment of instructional evaluation including many reference tools to aid administrators in carrying out such programs. The various phases of basic programs are outlined including the writing of objectives, the selection, design, and judgment

of quality of measuring instruments, recording findings, and other aspects. Guidelines are also given for formative, summative, and ex post facto types of evaluations.

Walker, Jerry, Blaine Worthen, Henry Brickell, Michael Scriven, and Daniel Stufflebeam. *Methodology of Evaluation*. Washington, DC: AERA, 1974.

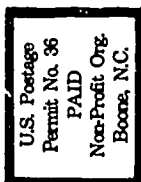
A cassette recording touching on various aspects of evaluation methodology. Topics included on the cassette are: "The Influence of Alternative, Structural, Organizational, or Managerial Options on the Role of Evaluation"; "Content Specialization in Educational Evaluation: A Necessary Marriage"; "Influence of External Political Factors on Evaluation Role and Methods"; and two discussants commenting on the previous papers.

Wood, Lynn, and Barbara Cross Davis. *Designing and Evaluating Higher Education Curricula*. Washington, DC: ERIC-AAHE, 1978. (Higher Education Research Report Series)

This book provides a basis for those who are beginning a program or curricular evaluation in higher education. It has been designed for use by faculty or administrators to evaluate their current curriculum, to assess the rationale behind the influences that promote curriculum change, and to design and implement new courses or programs.

This edition of **RIDE** was adapted from materials originally prepared for the Telementoring Project which is housed in the Reich College of Education at Appalachian State University. This FIPSE-funded project develops and delivers long-distance, state-of-the-art, continuing professional education and training to developmental educators across the nation. Representative training topics include content areas such as learning-and teaching-styles assessment and application, student development theory and matriculation management, teaching tips, and working with the adult learner.

Proposed as a cost-effective alternative to traditional staff-development activities, this delivery system comprises the diversity of electronic media including computer conferencing, videotapes, and real-time satellite TV in addition to more conventional means such as printed study guides and conference telephones. Inquiries regarding participation in the project should be addressed to the author.



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